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Ames Research Center

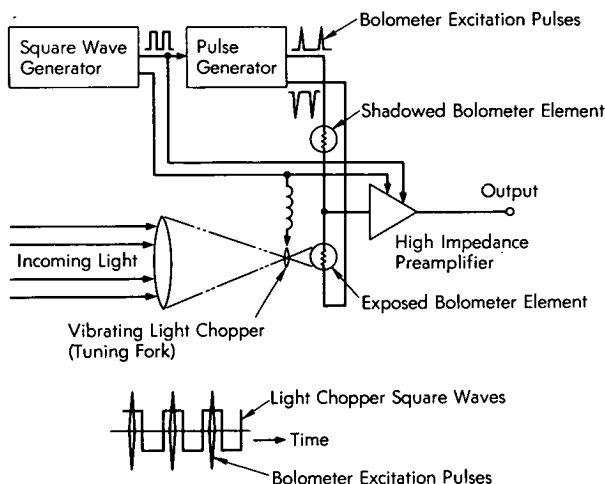


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Pulse Excitation of Bolometer Bridges

The problem:

To increase the signal-to-noise ratio of a bolometer sensor which operates on a chopped light beam.



The solution:

Drive the bolometer bridge by appropriately phased excitation pulses.

How it's done:

As shown in the figure, a square-wave generator drives a light chopper so that a square-wave train of light pulses falls on the bolometer element which is exposed to radiation. A pulse generator applies periodic excitation to the two-element bolometer bridge during a very short interval in the center of the duration of each light pulse as it falls on the

exposed bolometer element. The preamplifier is phased by the square-wave generator and the output signal is a product of the incoming radiation on the exposed bolometer element and the bridge excitation; the output is proportional to the excitation amplitude.

Since the bolometer bridge is excited by narrow pulses, high-level signals are generated without undue heating of the bolometers inasmuch as bolometer heating is proportional to both the excitation amplitude and the duty cycle; pulse excitation reduces the duty cycle of bolometer current, and thus reduces heating significantly.

Notes:

1. The pulse-excitation concept may be used to increase bolometer sensitivity since it allows a higher applied voltage to a given bolometer than is possible by conventional AC or DC excitation.
2. No other documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
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Reference: B72-10054

Patent status:

No patent action is contemplated by NASA.

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